UNITED STATES DISTRICT COURT
DISTRICT OF WYOMING

BIODIVERSITY CONSERVATION ALLIANCE and SIERRA CLUB,	)	
Plaintiffs,	)	
v.	)	Case No. 04CV 361-B
MOUNTAIN CEMENT COMPANY,	)	
Defendant.	)	

EXPERT REPORT OF BILL WILSON, P.E.
ON BEHALF OF PLAINTIFFS

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1. Summary of Opinions and Estimations

- It is my opinion that the excess opacity readings (defined here as all six-minute average stack opacity readings in excess of 20 percent) at Mountain Cement's Laramie Plant, Kiln #2, over the last five years could have been prevented through the installation and operation of an appropriately designed, sized, installed and operated baghouse.

- It is my opinion that the electrostatic precipitator (ESP) at Kiln #2 is not able consistently to keep opacity levels below 20 percent under the conditions that Mountain Cement operates Kiln #2 due to the ESP's size, design and condition. A baghouse at Mountain Cement's Kiln #2 would be a far superior method of pollution control compared to the current ESP, just as the baghouse at Kiln #1 has proved to be a far better method of pollution control than the former ESP at Kiln #1. A facility inspection would be necessary to add further detail to this opinion.

- I estimate that the capital cost of an appropriate baghouse for Kiln #2, in 2005 dollars, would be in the range of $3,200,000 to $3,500,000 not including site preparation such as foundations or structural steel, demolition and removal of the existing ESP if necessary,

or ancillary equipment. A site inspection would be needed to determine those costs and supplement this report.

- Based on the conversion of the ESP to a baghouse at Kiln #1, I estimate that if the existing ESP box at Kiln #2 is converted to a pulse jet baghouse that Kiln #2 would be shut down for approximately twelve weeks.

- Based on Mountain Cement documents, I estimate that for each week that Kiln #2 is down the net income loss due to lost cement sales would be approximately $406,665. Assuming the conversion process would take twelve weeks, the net loss in income would be approximately $4,800,000.

- Based on Mountain Cement and Environmental Protection agency documents, I estimate that the annual operation and maintenance cost of an appropriate baghouse for Kiln #2, after subtracting the annual operation and maintenance cost for the ESP ($150,000/year, 2005 dollars), would be in the range of $100,000 to $150,000.

- I estimate that to have prevented the excess opacity readings at Kiln #2 starting on October 1, 1999, Mountain Cement would have needed to have executed a baghouse construction contract by no later than January 1, 1999.

- I estimate a baghouse could be installed to control emissions from Kiln #2 in approximately 10 months from execution of a design and construction contract to the tie-in and startup of the equipment.

- It is my opinion that the excess opacity readings at Mountain Cement's Laramie Plant, Kiln #2, over the last five years also could have been prevented by reducing production at Kiln #2 by approximately 60 percent.

2. Bases for Opinions and Estimations

My opinions and cost and timing estimations are based on my expertise in pollution control systems for cement plants, my experience as the Environmental Manager at the North Texas Cement Company, my experiences in cost evaluations of capital projects, my education in the fields of Finance, Environmental Science and Engineering, my review of Mountain Cement, Wyoming Department of Environmental Quality and other documents and facts related to the Laramie Plant, and my consideration of the facts set forth below.

- *The large number of excess opacity readings at Mountain Cement's Kiln #2.* The quarterly excess opacity reports that Mountain Cement has filed with DEQ indicate that

there were 15,711 periods of 6 minute average excess opacity readings recorded at Kiln #2 from the 4th quarter of 1999 through the 1st quarter of 2005. **Attachment 1.**

- *Comparison over the last five years between excess opacity readings at Kiln #1 with a baghouse, and Kiln #2 without a baghouse.* The quarterly excess opacity reports show that from the 4th quarter of 1999 through the 1st quarter of 2005, Kiln #1 was operated with a baghouse and only had 208 periods of 6 minute average excess opacity readings, or an average of approximately 10 excess readings per quarter. Thirteen of those 22 quarters at Kiln #1 showed no excess readings and most quarters had very few. A fan disorder in just one quarter (the 4th quarter of 2002) accounted for 50 percent of the total excess opacity readings at Kiln #1 between the 4th quarter of 1999 and the 1st quarter of 2005. However, at Kiln #2, operated with an ESP, the frequency of excess opacity readings is much higher. During the same period of time (4th quarter of 1999 to the 1st quarter of 2005), Kiln #2 experienced 15,711 periods of 6 minute average excess opacity readings, or an average of approximately 714 periods of 6 minute average excess readings per quarter. Excess opacity readings at Kiln #2, operating with an ESP, were over 75 times greater than the excess opacity readings at Kiln #1, operating with a baghouse. **Attachment 2.**

- *The replacement of the ESP with a baghouse at Kiln #1.* On June 5, 1996, the Wyoming Department of Environmental Quality issued a Notice of Violation (NOV) to Mountain Cement that alleged opacity violations at Kiln #1. To address the NOV, and prevent future violations, Mountain Cement agreed to replace the ESP at Kiln #1 with a baghouse. June 21, 1996 Mountain Cement letter to DEQ, **Attachment 3.**

In its letter of June 21, 1996 to DEQ, Mountain Cement explained that a baghouse would "offer better compliance assurance" than the ESP. **Attachment 3.** The reasons Mountain Cement provided for replacing the Kiln #1 precipitator with a baghouse, quoted below from page 6, apply as well to Kiln #2 today. According to Mountain Cement:

> Baghouses will have higher maintenance costs and power consumption, are less resistant to high heat but they offer better compliance assurance, if kiln operations might be varied and if particulate load to the collector varies. The baghouse is not as sensitive to gas conditioning nor to the fineness or chemical composition of the particulate. Considering all currently identified variables related to kiln operation, existing precipitator dust composition and possibility of increased production, the best option was the precipitator conversion.

- The loading of particulate matter into the ESP for Kiln #2 appears to be beyond the design specifications of the ESP. Based on the information that I have reviewed, the ESP on Kiln #2 was designed to control particulate emissions from a wet process cement kiln producing 900 ton per day of clinker. The 1978 design parameters used to size the ESP and the performance guarantees provided by the vendor (Mikropul) were based on a wet process gas volume of 246,000 actual cubic feet per minute (acfm) at 550 degrees Fahrenheit and an inlet grain loading of 15 grains per actual cubic feet (gr/acf). **Attachment 4**.

- However, Mountain Cement's 1987 application to the DEQ for modification of Kiln #2 to a dry process and an increase in production to 1,500 tons per day (tpd) of clinker states that the inlet grain loading to the ESP with the raw mill on would actually be 23.7 gr/acf. **Attachment 5**. This is an increase in inlet grain loading of over 50% above the vendor guarantee. Based on the RETEC Kiln #2 stack test dated January 2, 2004, measured gas volumes are as high as 272,858 actual cubic feet per minute. **Attachment 6**. I have seen no evidence that the Kiln #2 ESP was substantially resized or redesigned to accommodate the increased grain loadings, temperatures, and gas volumes resulting from the modification from a 900 tpd wet process kiln to a 1,500 tpd dry process kiln in 1987.

- The maintenance and inspection reports for the ESP appear to indicate that the pollution control device is being asked to do more than it can handle. Inspections of the Kiln #2 ESP performed for Mountain Cement by TRK Engineering Services, Inc. for each of the years 2000 through 2004 refer to problems leading to excess opacity caused by operating the ESP beyond its original design parameters.

  In its 2000 and 2001 reports, at **Attachment 7**, pp. 3888 – 3890, and pp. 3934 – 3939, TRK refers to high gas volumes leading to: temperature stratification of the gas flow resulting in zones of varying resistivity, reduced treatment time, and increased leakage of air into the ESP, all of which can result in poor performance.

  TRK points out that increased air leakage is prevalent and can lead to increased corrosion, poor gas distribution, and material reentrainment or buildup resulting in increases in opacity. TRK notes that operations at elevated temperatures that occur when the raw mill is shut down or when the water spray tower is off-line led to damage to collecting plates and walls of the inlet duct. TRK states that collecting plates have been bowed and bent by these temperature excursions. Damage to the plates led to close clearances between the plates and other ESP components. TRK points out that "close clearances decrease the sparkover voltage and can lead to a reduction in power and lower ESP performance." TRK notes the asymmetrical distribution of those higher gas flows to the east and west precipitator units caused by the poor design of the raw mill and mill

bypass ducting into the precipitator as a source of poor performance. TRK states that "the precipitator has many problems related to design." TRK also notes the lack of a regular maintenance program for such things as blower/heater systems for the insulator compartments/transformer rectifier enclosures, transformer oil, rapper drive motors, and material buildup. **Attachment 7**.

In 2004 TRK confirmed that the problems noted above persist. "There has been and continues to be damage to the collecting plates resulting from both design deficiencies and a number of mechanical anomalies." Further, TRK states, "Unfortunately, some of the repairs made in the recent past, in particular the shock bars, remain a persistent problem that will only be overcome by rebuilding with a better design." **Attachment 8**, p. 3791. I understand that TRK performed an inspection of the ESP at Kiln #2 n the spring of 2005, but that Mountain Cement has not disclosed that report to the plaintiffs. To see this report, and the ESP itself, would be very helpful to my analysis.

- The use of baghouses to control dry process kiln emissions at the other cement plants in which Mountain Cement's parent company, Eagle Materials, Inc., has an ownership interest. This includes the Illinois Cement Co. plant in La Salle, Illinois, the Texas Lehigh Cement Co. plant in Buda, Texas, and the Nevada Cement Co. plant in Fernley, Nevada. **Attachment 9**.

- The use of baghouses to control dry process kiln emissions at Mountain Cement's competitor plants. This includes the Cemex cement plant in Lyons, Colorado, and the GCC Dacotah cement plant in Rapid City, South Dakota. **Attachment 10**.

- My opinion that excess opacity readings at Mountain Cement's Laramie plant, Kiln #2, over the last five years could have been prevented by reducing production at Kiln #2 by approximately 60 percent is based on Mountain Cement Company's letter to the Wyoming Department of Environmental Quality (DEQ) dated June 21, 1996 which proposes the following interim corrective action in response to the Notice of Violation Docket No. 2751-96: "Maintaining the kiln feed rate at or below 28 TPH. This limits the amount of particulate that is stripped off as it is being introduced into the kiln thus reducing the particulate load to the precipitator." **Attachment 3**. Mountain Cement Company's June 21, 1996 letter to DEQ notes on page 6 that: "The primary consideration was to achieve NSPS compliance at less than or equal to that approved on permit No. CT-1137 at any production rate (48 TPH maximum feed rate into the kiln, .3 lbs. of particulate emission per ton of feed)." Reducing the maximum feed rate from 48 TPH to 28 TPH to achieve compliance is a reduction of approximately 60 percent.

- My estimation that if the existing ESP box is converted to a pulse jet baghouse that Kiln #2 would be shut down for approximately twelve weeks during the conversion process is based on the compliance schedule for conversion of the ESP box on Kiln #1 to a pulse jet baghouse developed by Mountain Cement and set forth in its letter to DEQ of June 21, 1996. **Attachment 3.**

- My estimation that for each week that Kiln #2 is down during the conversion process the potential cost to Mountain Cement Company from lost production would be approximately $406,665 is based on Mountain Cement Company's Capital Expenditures Request CER #03-504 prepared on November 18, 2002. **Attachment 11, p. 2.** According to Mountain Cement, a loss in production at Kiln #2 of 8,186 tons of cement represents a loss in profit of $317,053, or $38.73 per ton. Kiln #2 produces an average of 10,500 tons per week. Therefore a loss in cement production of 10,500 tons per week represents a profit loss of $406,665 (10,500 tons x $38.73/ton).

- My estimation of the net increase in annual operation and maintenance costs if the Kiln #2 ESP is replaced by a baghouse is based on a $150,000 annual operation and maintenance cost for the ESP as described by Mountain Cement, **Attachment 12**, and on the annual operation and maintenance cost for an appropriate baghouse for Kiln #2 of $250,000 to $300,000 based on EPA's 2002 Pollution Control Cost Manual for baghouses. **Attachment 13.**

- My opinion that a baghouse could be installed to control emissions from Kiln #2 in approximately 10 months from execution of a design and construction contract to the tie-in and startup of the equipment is based on the compliance schedule for conversion of the ESP box on Kiln #1 to a pulse jet baghouse developed by Mountain Cement. **Attachment 3.**

- My opinions and estimations may need to be changed or supplemented to the extent I uncover any mistakes, or receive additional information including that obtained from documents, electronic databases, and a facility inspection.

3. Qualifications and Compensation.

- My current resume is attached as **Attachment 14**.
- My fee as an expert witness is $45 per hour, and $85 per hour for testifying at any deposition or trial.
- I have not authored any publications, and I have not testified as an expert in the last four years at trial or a deposition.
- I declare under the penalty of perjury that the statements in this report are true and accurate to the best of my knowledge, and that the attachments to this report represent true and accurate copies of the originals.

June 12, 2005
Dated

Bill Wilson
Bill Wilson, P.E.

Attachments to Bill Wilson's Expert Report
June 12, 2005

Attachment 1:	Opacity Summary for Kiln #2
Attachment 2:	Opacity Summary for Kiln #1
Attachment 3:	June 21, 1996 letter from Mountain Cement to DEQ regarding replacement of ESP with baghouse.
Attachment 4:	1978 design and performance parameters for Kiln #2 ESP (Mikropul)
Attachment 5:	Mountain Cement's 1987 application to the DEQ for modification of Kiln #2, excerpts.
Attachment 6:	January 2, 2004 RETEC stack test, excerpts.
Attachment 7:	TRK 2000 and 2001 reports, cover pages and pp. 3888 – 3890, and pp. 3934 – 3939
Attachment 8:	TRK 2004 report, cover page and p. 3791.
Attachment 9:	Permit documents showing use of baghouses to control kiln emissions at Illinois Cement Co. plant in La Salle, Illinois, the Texas Lehigh Cement Co. plant in Buda, Texas, and the Nevada Cement Co. plant in Fernley, Nevada
Attachment 10:	Permit documents showing use of baghouses to control kiln emissions at Mountain Cement competitor plants, including Cemex cement plant in Lyons, Colorado, and GCC Dacotah cement plant in Rapid City, South Dakota.
Attachment 11:	November 18, 2002 Mountain Cement Capital Expenditures Request CER #03-504.
Attachment 12:	December 18, 2002 Mountain Cement letter to DEQ showing annual operation and maintenance cost for Kiln #2 ESP.
Attachment 13:	EPA's Pollution Control Cost Manual for baghouses, excerpts.
Attachment 14:	Resume of Bill Wilson, P.E.